8.3.

a. If $\bar{x} > 205.2344$ reject $H_o$
If $\bar{x} \leq 205.2344$ do not reject $H_o$

$\bar{x}_\alpha = 200 + 1.645(45/\sqrt{200})$; $\bar{x}_\alpha = 205.2344$

If $z > 1.645$ reject $H_o$
If $z \leq 1.645$ do not reject $H_o$

b. $z = (204.50 - 200)/(45/\sqrt{200}) = 1.41$; Since $1.41 < 1.645$ do not reject $H_o$
Since $204.5 < 205.2344$ do not reject $H_o$

c. The alternative hypothesis. The burden of proof is always to on the alternative hypothesis.

8.6.

a. 0.0735
b. 0.0099
c. 0.9693
d. 0.5
e. 1

8.16.

a. $H_o$: $\mu = 24$ ounces
$H_a$: $\mu \neq 24$ ounces

b. $t = (24.32 - 24)/(0.7/\sqrt{16}) = 1.83$

$t_{.05/2} = \pm 2.1315$

Since $-2.1315 < 1.83 < 2.1315$ do not reject $H_o$ and conclude that the filling machine remains all right to operate.

c. Because the production control manager does not want the boxes under-filled or over-filled.

d. Using Excel's TDIST function, p-value = 0.0872 > 0.025; therefore do not reject $H_o$

e. Since the null hypothesis was "accepted", a Type II error may have been committed.

8.27.

a. $\bar{p}_\alpha = p + z\sqrt{\frac{p(1-p)}{n}} = .24 + 1.645\sqrt{\frac{.24(1-.24)}{100}}$ ; .3103

If p > .3103, reject the null hypothesis

Otherwise, do not reject

Since .27 < .3103, do not reject the null hypothesis

b. $z = \frac{\bar{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.27 - .24}{\sqrt{\frac{.24(1-.24)}{100}}} = .7024$

If z > 1.645, reject the null hypothesis

Otherwise, do not reject

Since .7024 < 1.645, do not reject

8.31.

a. $H_o$: $p \geq 0.01$
$H_a$: $p < 0.01$

$\bar{p}$ = 6/800 = 0.0075

z = (0.0075 – 0.01)/ $\sqrt{(0.01)(1-0.01)/800}$ = -0.7107

Decision Rule:

If z < -1.645 reject $H_o$, otherwise do not reject

Since z = -0.7107 > -1.645 do not reject and conclude that the percentage of lost luggage is 1% or more.

b. 0.0075 $\pm$ 1.96( $\sqrt{(0.0075)(1-0.0075)/800}$ ); .0075 $\pm$ .006 ; [0.0015 , 0.0135]

8.74.

a. $H_o$: $\mu \le 200$
$H_a$: $\mu > 200$

Decision Rule:

If t > 1.345 reject $H_o$, otherwise do not reject $H_o$

$t = (210 - 200)/(40/\sqrt{15}) = 0.9682$

Since t = 0.9682 < 1.345 do not reject $H_o$ and conclude that the increase in reading speed is 200 or less words per minute.

b. You must assume that the underlying population is normally distributed.

c. Decision Rule:

If t > 1.345 reject $H_o$, otherwise do not reject $H_o$

$t = (210 - 200)/(20/\sqrt{15}) = 1.9365$

Since t = 1.9365 > 1.345 reject $H_o$ and conclude that the increase in reading speed is more than 200 words per minute.

d. The sampling distribution is less spread out so a sample result of 210 is relatively less likely from a population that is thought to have a mean of 200.

8.75.

a. $H_o$: $p \le 0.30$
$H_a$: $p > 0.30$

Decision Rule:

If z > 1.28 reject $H_o$, otherwise do not reject

$\overline{p} = 74/200 = 0.37$

$z = (0.37 - 0.30)/\sqrt{(0.30)(1-0.30)/200} = 2.1602$

Since 2.1602 > 1.28 reject $H_o$ and conclude that greater than 30% of coupons are being redeemed.

b. $0.37 \pm 1.645\sqrt{(0.37)(1-0.37)/200}$; .37 $\pm$ .0562 ; 0.3138 ----- 0.4262

(0.3138)($0.10)(5000) ----- (0.4262)($0.10)(5000); $156.90 ----- $213.10